

=> b hcap

FILE 'HCAPLUS' ENTERED AT 14:16:22 ON 03 NOV 2006

=> d all hitstr l34 tot

L34 ANSWER 1 OF 5 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2003:716682 HCAPLUS Full-text

ED Entered STN: 12 Sep 2003

TI Tall fescue variety having rhizomes

IN De, Bruijn Jacobus

PA Barenbrug Usa, Inc., USA

SO U.S. Pat. Appl. Publ.

CODEN: USXXCO

DT Patent

LA English

IC ICM A01H005-00

INCL 800320000

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	US 2003172415	A1	20030911	US 2002-66345	2002 0130
				<--	
	US 6677507	B2	20040113		
	US 2004143875	A1	20040722	US 2004-754149	2004 0109

PRAI US 2002-66345 A3 20020130 <--

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
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US 20030172415	ICM	A01H005-00
	INCL	800320000
	IPCI	A01H0005-00 [ICM,7]
	IPCR	A01H0005-12 [I,C*]; A01H0005-12 [I,A]
	NCL	800/320.000
	ECLA	A01H005/12
US 2004143875	IPCI	A01H0005-00 [ICM,7]
	IPCR	A01H0005-12 [I,C*]; A01H0005-12 [I,A]
	NCL	800/320.000
	ECLA	A01H005/12

AB A tall fescue variety known as breeder's code Bar Fa 08PB and seed used to produce the grass are provided. Methods of using the grass plant and the seed are also provided. This grass is suitable for use in turf (lawns, pastures, golf courses, sod, and other areas where excellent turf quality is desired) and forage pastures.

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Anon; A. D. Agronomy journal Nov. 1992, V84(6), P919

(2) Bouton; Agron. J. 1989, V81, P220

(3) Bouton; Crop Sci. 1992, V32, P686

(4) De Battista; Crop Sci. 1990, V30, P536

(5) Jain; Indian J. Exp. Biol. 2000, V38, P6 MEDLINE

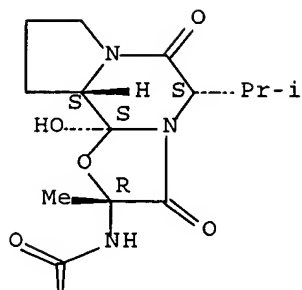
(6) Jernstedt; Crop Sci. 1985, V25, P539

(7) Wilkinson; Agron. J. 1968, V60, P359

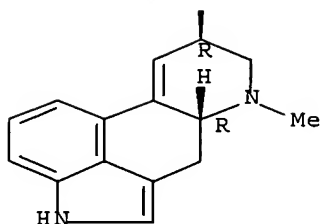
L34 ANSWER 2 OF 5 HCAPLUS COPYRIGHT 2006 ACS on STN
 AN 1998:148402 HCAPLUS Full-text
 DN 128:255126
 ED Entered STN: 12 Mar 1998
 TI Occurrence of extreme alkaloid levels in endophyte-infected
 perennial ryegrass, tall fescue, and meadow fescue
 AU Lane, G. A.; Tapper, B. A.; Davies, E.; Christensen, M. J.; Latch,
 G. C. M.
 CS AgResearch Grasslands, Palmerston North, N. Z.
 SO Neotyphodium/Grass Interactions, [Proceedings of the International
 Symposium on Acremonium/Grass Interactions], 3rd, Athens, Ga., May
 28-31, 1997 (1997), 433-436. Editor(s): Bacon, Charles W.; Hill,
 Nicholas S. Publisher: Plenum, New York, N. Y.
 CODEN: 65SXAW
 DT Conference
 LA English
 CC 11-1 (Plant Biochemistry)
 Section cross-reference(s): 10
 AB Ergovaline concns. exceeding 20 ppm were observed for about 1% of the samples
 with levels up to 75% recorded. The highest levels were found with pseudostem
 and herbage samples for Ensign meadow fescue (*Festuca pratensis*) artificially
 infected with tall fescue endophyte strains (*Neotyphodium coenophialum* and
Neotyphodium sp. taxonomic class FaTG2). High ergovaline levels were found in
 a number of naturally and artificially infected tall fescue (*F. arundinacea*)
 and perennial ryegrass (*Lolium perenne*) samples. Peramine concns. exceeding
 60 ppm were observed for about 2% of samples with levels up to 175 ppm
 recorded. The highest lolitrem concentration recorded (31 ppm) was for a
 pseudostem sample from perennial ryegrass infected with an unidentified
 endophyte grown in the greenhouse. Concns. exceeding 15 ppm were observed for
 several samples of perennial ryegrass with natural infections with *N. lolii*
 and unidentified strains, and artificial infections with the the fine fescue
 endophyte strain F11.
 ST alkaloid fescue perennial ryegrass endophyte infection
 IT Fescue (*Festuca elatior*)
Lolium perenne
Neotyphodium
Neotyphodium coenophialum
Neotyphodium lolii
 (extreme alkaloid levels in endophyte-infected perennial
 ryegrass, tall fescue, and meadow fescue)
 IT Alkaloids, biological studies
 (extreme alkaloid levels in endophyte-infected perennial
 ryegrass, tall fescue, and meadow fescue)
 IT 2873-38-3, Ergovaline 81771-19-9,
 Lolitrem B 102482-94-0, Peramine
 (extreme alkaloid levels in endophyte-infected perennial
 ryegrass, tall fescue, and meadow fescue)
 RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD
 RE
 (1) Barker, D; Proceedings of the Second International Symposium on
 Acremonium/Grass Interactions 1993, P67
 (2) Christensen, M; Mycol Res 1993, V97, P1083
 (3) Welty, R; Plant Dis 1994, V78, P845 HCAPLUS
 IT 2873-38-3, Ergovaline 81771-19-9,
 Lolitrem B
 (extreme alkaloid levels in endophyte-infected perennial
 ryegrass, tall fescue, and meadow fescue)
 RN 2873-38-3 HCAPLUS
 CN Ergotaman-3',6',18-trione, 12'-hydroxy-2'-methyl-5'-(1-
 methylethyl)-, (5' α)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.

PAGE 1-A



PAGE 2-A



RN 81771-19-9 HCAPLUS .
CN 7H-[1,3]Dioxino[5'',4'':2',3']oxireno[4',4'a][1]benzopyrano[5',6':
6,7]indeno[1,2-b]isobenzofuro[5,6-e]indol-13(8H)-one,
1,4a,4b,5b,6,7a,9,9a,10,12,12a,16,16b,16c,17,18,18a,19a-
octadecahydro-5b-hydroxy-1,1,10,10,12,12,16b,16c-octamethyl-3-(2-
methyl-1-propenyl)-, (3S,4aR,4bR,5aS,5bS,7aS,9aR,12aR,16bS,16cR,18
aS,19aS)- (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L34 ANSWER 3 OF 5 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1996:41447 HCAPLUS Full-text
DN 124:109246
ED Entered STN: 20 Jan 1996
TI Correlation of quantities of ergovaline and
lolitrem B toxins to clinical cases of tall
fescue toxicosis and perennial ryegrass staggers
AU Tor-Agbidye, J.; Blythe, L. L.; Craig, A. M.
CS Coll. Vet. Med., Oregon State Univ., Corvallis, OR, USA

SO Plant-Associated Toxins: Agricultural, Phytochemical and Ecological Aspects, [Proceedings of the International Symposium on Poisonous Plants], 4th, Fremantle, Australia, Sept. 26-Oct. 1, 1993 (1994), Meeting Date 1993, 369-74. Editor(s): Colegate, Steven M.; Dorling, Peter R. Publisher: CAB International, Wallingford, UK.
CODEN: 62FFAS

DT Conference

LA English

CC 4-3 (Toxicology)
Section cross-reference(s): 1

AB Toxicities of ergovaline and lolitrem B in livestock are discussed and HPLC chromatograms of these chems. from endophyte-infected tall fescue seed (ergovaline) and perennial ryegrass seed (lolitrem B) are given.

ST ergovaline lolitrem B toxicosis

IT Lolium perenne
(correlation of quantities of ergovaline and lolitrem B toxins to clin. cases of tall fescue toxicosis and perennial ryegrass staggers)

IT Fescue
(Festuca elatior, correlation of quantities of ergovaline and lolitrem B toxins to clin. cases of tall fescue toxicosis and perennial ryegrass staggers)

IT 2873-38-3, Ergovaline 81771-19-9,
Lolitrem B
(correlation of quantities of ergovaline and lolitrem B toxins to clin. cases of tall fescue toxicosis and perennial ryegrass staggers)

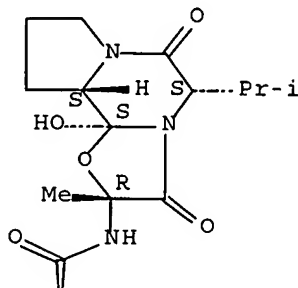
IT 2873-38-3, Ergovaline 81771-19-9,
Lolitrem B
(correlation of quantities of ergovaline and lolitrem B toxins to clin. cases of tall fescue toxicosis and perennial ryegrass staggers)

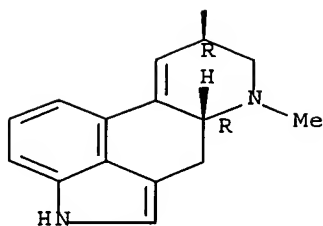
RN 2873-38-3 HCAPLUS

CN Ergotaman-3',6',18-trione, 12'-hydroxy-2'-methyl-5'-(1-methylethyl)-, (5'α)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.

PAGE 1-A





RN 81771-19-9 HCAPLUS
 CN 7H-[1,3]Dioxino[5'',4'':2',3']oxireno[4',4'a][1]benzopyrano[5',6':6,7]indeno[1,2-b]isobenzofuro[5,6-e]indol-13(8H)-one,
 1,4a,4b,5b,6,7a,9,9a,10,12,12a,16,16b,16c,17,18,18a,19a-
 octadecahydro-5b-hydroxy-1,1,10,10,12,12,16b,16c-octamethyl-3-(2-
 methyl-1-propenyl)-, (3S,4aR,4bR,5aS,5bS,7aS,9aR,12aR,16bS,16cR,18
 aS,19aS)- (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L34 ANSWER 4 OF 5 HCAPLUS COPYRIGHT 2006 ACS on STN
 AN 1995:415383 HCAPLUS Full-text
 DN 122:180352
 ED Entered STN: 15 Mar 1995
 TI Analysis of endophyte toxins: fescue and other grasses toxic to
 livestock
 AU Porter, J. K.
 CS Richard B. Russell Agriculture Research Center, ARS, USDA, Athens,
 GA, 30613, USA
 SO Journal of Animal Science (1995), 73(3), 871-80
 CODEN: JANSAG; ISSN: 0021-8812
 PB American Society of Animal Science
 DT Journal; General Review
 LA English
 CC 4-0 (Toxicology)
 Section cross-reference(s): 11
 AB A review and discussion with many refs. Research on livestock toxicoses
 caused by Acremonium (endophyte)-infected grasses strongly implicate the
 ergopeptine alkaloids with A. coenophialum-infected fescue and paxilline and
 the lolitrem alkaloids with A. lolii-infected perennial ryegrass as the
 causative agents. Isolation, identification, and detection of these toxins
 involves extraction with appropriate solvents, clean-up procedures, and
 chromatog. methods with known stds. Thin-layer, high-performance liquid, and
 gas chromatog. along with UV and mass spectrometric (i.e., electron impact,
 chemical ionization, tandem mass) characterizations have been reported. These
 methods have varying degrees of success depending on the matrix from which the
 alkaloids have been extracted Ergovaline is the primary ergopeptine alkaloid
 isolated from cultures of A. coenophialum and also from infected fescue grass
 and seeds toxic to livestock. Other compds. isolated from the endophyte-
 infected fescue include: lysergic acid amide (ergine), the clavine class of
 ergot alkaloids (chanoclavine I, agroclavine, elymoclavine, penniclavine), the
 pyrrolizidine alkaloids (N-formylloline, N-acetylloline, N-methyloline, N-

acetylnorloline), and the unique pyrrolopyrazine alkaloid peramine. The loline alkaloids and peramine have been more associated with the insect-deterrent properties of the endophyte-infected fescue than with livestock toxicoses. Also, both peramine and the ergopeptine alkaloids (ergovaline, ergotamine) have been isolated from *A. lolii*-infected perennial ryegrass. More recently, paxilline and lolitrem B have been detected in laboratory cultures of *A. coenophialum* isolated from tall fescue. The ergot alkaloids in endophyte-infected perennial ryegrass may be more related to decreased animal productivity (weight gains, reproduction problems), whereas the lolitremes cause the staggers syndrome. The detection, isolation, identification, and analyses of these compounds from *Acremonium*-infected grasses is presented.

ST review endophyte toxin fescue livestock; grass livestock endophyte toxin review

IT *Acremonium*

Fescue

Grass

Toxicity

(endophyte toxins in relation to fescue and other grasses toxic to livestock)

IT Toxins

(endophyte toxins in relation to fescue and other grasses toxic to livestock)

IT Animal

(livestock, endophyte toxins in relation to fescue and other grasses toxic to livestock)

L34 ANSWER 5 OF 5 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 1991:98489 HCAPLUS Full-text

DN 114:98489

ED Entered STN: 23 Mar 1991

TI Fungal endophyte-infected grasses: alkaloid accumulation and aphid response

AU Siegel, M. R.; Latch, G. C. M.; Bush, L. P.; Fannin, F. F.; Rowan, D. D.; Tapper, B. A.; Bacon, C. W.; Johnson, M. C.

CS Plant Pathol. Dep., Univ. Kentucky, Lexington, KY, 40546, USA

SO Journal of Chemical Ecology (1990), 16(12), 3301-15

CODEN: JCECD8; ISSN: 0098-0331

DT Journal

LA English

CC 11-5 (Plant Biochemistry)

AB The occurrence of the alkaloids N-formyl and N-acetyl loline, peramine, lolitrem B, and ergovaline and the response of aphids to plants containing these compounds were determined in species and cultivars of *Festuca*, *Lolium*, and other grass genera infected with fungal endophytes (*Acremonium* spp., and *Epichloe typhina*). Twenty-nine of 34 host-fungus associations, produced one or more of the alkaloids, most frequently peramine or ergovaline. Three alkaloids (lolines, peramine, and ergovaline) were found in tall fescue and in perennial ryegrass infected with *A. coenophialum*, while peramine, lolitrem B, and ergovaline were present in perennial ryegrass and in tall fescue infected with *A. lolii* and in *F. longifolia* infected with *E. typhina*. While *A. coenophialum* and *A. lolii* produced similar patterns of alkaloids regardless of the species or cultivar of grass they infected, isolates of *E. typhina* produced either no alkaloids or only one or two different alkaloids in the grasses tested. Aphid bioassays indicated that *Rhopalosiphum padi* and *Schizaphis graminum* did not survive on grasses containing loline alkaloids and that *S. graminum* did not survive on peramine-containing grasses. Ergovaline - containing grasses did not affect either aphid.

ST alkaloid grass fungi endophyte aphid

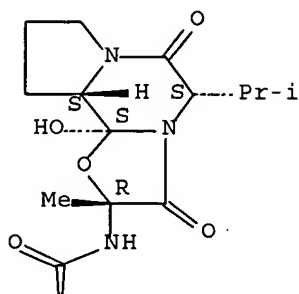
IT Alkaloids, biological studies

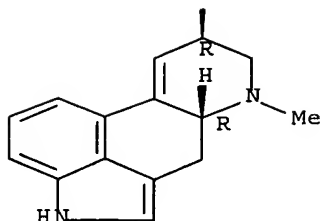
(accumulation of, in fungal endophyte-infected grasses, aphid

response in relation to)
 IT ~~Fescue~~
 Grass
 Lolium perenne
 (alkaloid accumulation in fungal endophyte-infected, aphid
 response in relation to)
 IT Acremonium
 Epichloe typhina
 (alkaloid accumulation in grass species infected with, aphid
 response in relation to)
 IT Aphid
 Rhopalosiphum fitchii
 Schizaphis graminum
 (response of, to fungal endophyte-infected grasses, alkaloid
 accumulation in relation to)
 IT 2873-38-3, Ergovaline 4914-36-7, N-Acetyl
 loline 38964-33-9, N-Formyl loline 81771-19-9
 102482-94-0, Peramine
 (accumulation of, in fungal endophyte-infected grasses, aphid
 response in relation to)
 IT 2873-38-3, Ergovaline 81771-19-9
 (accumulation of, in fungal endophyte-infected grasses, aphid
 response in relation to)
 RN 2873-38-3 HCAPLUS
 CN Ergotaman-3',6',18-trione, 12'-hydroxy-2'-methyl-5'-(1-
 methylethyl)-, (5' α)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.

PAGE 1-A





RN 81771-19-9 HCAPLUS
 CN 7H-[1,3]Dioxino[5'',4'':2',3']oxireno[4',4'a][1]benzopyrano[5',6':6,7]indeno[1,2-b]isobenzofuro[5,6-e]indol-13(8H)-one,
 1,4a,4b,5b,6,7a,9,9a,10,12,12a,16,16b,16c,17,18,18a,19a-
 octadecahydro-5b-hydroxy-1,1,10,10,12,12,16b,16c-octamethyl-3-(2-
 methyl-1-propenyl)-, (3S,4aR,4bR,5aS,5bS,7aS,9aR,12aR,16bS,16cR,18
 aS,19aS)- (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

=> b biosis

FILE 'BIOSIS' ENTERED AT 14:16:40 ON 03 NOV 2006

=> d all 148 tot

L48 ANSWER 1 OF 10 BIOSIS COPYRIGHT (c) 2006 The Thomson Corporation
 on STN
 AN 2005:177415 BIOSIS Full-text
 DN PREV200500178317
 TI Distribution of lolitrem B and
 ergovaline in the lactating goat after an intraruminal
 administration.
 Original Title: Distribution du lolitreme B et de l'
 ergovaline apres un bolus intraruminal chez la chevre en
 lactation.
 AU Grancher, D. [Reprint Author]; Durix, A.; Moulard, Y.; Bonnaire,
 Y.; Carcelen, M.; Camier, Y.; Bony, S.
 CS INRADGERUMR 1233, ENV Lyon, BP 83, F-69280, Marcy Etoile, France
 SO Rencontres Autour des Recherches sur les Ruminants, (2004) Vol.
 11, pp. 37. print.
 ISSN: 1279-6530 (ISSN print).
 DT Article
 LA French
 ED Entered STN: 11 May 2005
 Last Updated on STN: 11 May 2005
 CC Digestive system - Physiology and biochemistry 14004
 Blood - Blood and lymph studies 15002
 Blood - Blood cell studies 15004
 Reproductive system - Physiology and biochemistry 16504
 Toxicology - General and methods 22501
 Animal production - General and methods 26502
 Animal production - Breeds and breeding 26506
 Public health - General and miscellaneous 37001
 Plant physiology - Reproduction 51512
 IT Major Concepts

Animal Husbandry (Agriculture); Digestive System (Ingestion and Assimilation); Public Health (Allied Medical Sciences); Reproductive System (Reproduction); Toxicology

IT Parts, Structures, & Systems of Organisms
blood: blood and lymphatics; milk: reproductive system; rumen: digestive system

IT Chemicals & Biochemicals
ergovaline: intraruminal administration, mycotoxin, toxin; lolitrem B: intraruminal administration, mycotoxin, toxin

IT Miscellaneous Descriptors
concentration profile; lactation; pharmacokinetic behavior; plant resistance; toxin distribution

ORGN Classifier
Ascomycetes 15100
Super Taxa
Fungi; Plantae
Organism Name
Neotyphodium (genus)
Taxa Notes
Fungi, Microorganisms, Nonvascular Plants, Plants

ORGN Classifier
Bovidae 85715
Super Taxa
Artiodactyla; Mammalia; Vertebrata; Chordata; Animalia
Organism Name
goat (common): breed-Saanen, female
Taxa Notes
Animals, Artiodactyls, Chordates, Mammals, Nonhuman Vertebrates, Nonhuman Mammals, Vertebrates

ORGN Classifier
Gramineae 25305
Super Taxa
Monocotyledones; Angiospermae; Spermatophyta; Plantae
Organism Name
Festuca arundinacea (species) [tall fescue (common)]
Lolium perenne (species) [perennial ryegrass (common)]
Taxa Notes
Angiosperms, Monocots, Plants, Spermatophytes, Vascular Plants

ORGN Classifier
Hominidae 86215
Super Taxa
Primates; Mammalia; Vertebrata; Chordata; Animalia
Organism Name
human (common)
Taxa Notes
Animals, Chordates, Humans, Mammals, Primates, Vertebrates

RN 2873-38-3 (ergovaline)
81771-19-9 (lolitrem B)

L48 ANSWER 2 OF 10 BIOSIS COPYRIGHT (c) 2006 The Thomson Corporation on STN

AN 2004:228210 BIOSIS Full-text

DN PREV200400230459

TI Incidence of Neotyphodium endophytes among naturalized perennial ryegrass and tall fescue plants in northern Japan and alkaloid concentration of the seeds from infected plants.

AU Saiga, Suguru [Reprint Author]; Inoue, Tatsushi; Nakashima, Hiroshi; Maejima, Atsuo [Reprint Author]; Yoshida, Shyunya [Reprint Author]; Tsuiki, Mikinori [Reprint Author]

CS Faculty of Agriculture, Iwate University, Ueda, Morioka, 020-8550,
Japan

SO Grassland Science, (December 2003) Vol. 49, No. 5, pp. 444-450.
print.
CODEN: NPSGAI. ISSN: 0447-5933.

DT Article

LA English

ED Entered STN: 28 Apr 2004
Last Updated on STN: 28 Apr 2004

AB The incidence of *Neotyphodium* endophytes was investigated for naturalized perennial ryegrass (*Lolium perenne* L.) and tall fescue (*Festuca arundinacea* Schreb.) plants collected from roadsides in northern Japan. Fifty seeds were collected from each of three plants at each site. Ten seeds from each plant were tested for endophyte infection and another 10 seeds from those plants found to be infected were used for the analysis of ergovaline and lolitrem B concentration. Perennial ryegrass was collected from 59 sites and tall fescue from 71 sites. Percentages of infected plants were 10% (18/179) in perennial ryegrass and 15% (32/213) in tall fescue. Average ergovaline concentrations in seeds were 1.86 ppm and 6.27 ppm in perennial ryegrass and tall fescue, respectively. Average lolitrem B concentration in perennial ryegrass was 1.41 ppm. Concentrations of alkaloids differed markedly among the collected plants. Neither ergovaline nor lolitrem B were detected in seeds from perennial ryegrass plants collected from Fukaura. Existence of infected plants with a low concentration of alkaloid may indicate the possibility of usage as forages by investigating characteristics of the endophyte strains.

CC Toxicology - General and methods 22501
Public health: epidemiology - Communicable diseases 37052
Public health: epidemiology - Miscellaneous 37056
Plant physiology - Growth, differentiation 51510
Agronomy - Miscellaneous and mixed crops 52502
Agronomy - Forage crops and fodder 52506
Pest control: general, pesticides and herbicides 54600

IT Major Concepts
Agronomy (Agriculture); Epidemiology (Population Studies);
Infection; Pest Assessment Control and Management; Toxicology

IT Chemicals & Biochemicals
alkaloid: concentration

IT Miscellaneous Descriptors
endophyte incidence

GT Japan (Asia, Palearctic region).

ORGN Classifier
Ascomycetes 15100
Super Taxa
Fungi; Plantae
Organism Name
Neotyphodium (genus): pathogen, endophyte
Taxa Notes
Fungi, Microorganisms, Nonvascular Plants, Plants

ORGN Classifier
Gramineae 25305
Super Taxa
Monocotyledones; Angiospermae; Spermatophyta; Plantae
Organism Name
Festuca arundinacea (species) [tall fescue
(common)]: seed, forage crop, host
Lolium perenne (species) [perennial ryegrass (common)]: seed,
forage crop, host
Taxa Notes
Angiosperms, Monocots, Plants, Spermatophytes, Vascular Plants

L48 ANSWER 3 OF 10 BIOSIS COPYRIGHT (c) 2006 The Thomson Corporation
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AN 2002:571923 BIOSIS Full-text

DN PREV200200571923

TI Alkaloid content in Neotyphodium-infected seeds of perennial
ryegrass wild populations from the North of Spain.
Original Title: Contenido en alcaloides en semillas de poblaciones
naturales de raigras ingles del norte de Espana infectadas con los
hongos endofitos Neotyphodium.

AU Oliveira, J. A. [Reprint author]; Rottinghaus, G. E.; Prego, C.;
Gonzalez, E.

CS Dpto. de Biologia de Organismos y Sistemas, Area de Produccion
Vegetal, Universidad de Oviedo, C/Catedratico Rodrigo Uria s/n,
33071, Oviedo, Spain
oliveira@correo.uniovi.es

SO Investigacion Agraria Produccion y Proteccion Vegetales, (
Agosto, 2002) Vol. 17, No. 2, pp. 247-256. print.
CODEN: IAPVES. ISSN: 0213-5000.

DT Article

LA Spanish

ED Entered STN: 7 Nov 2002
Last Updated on STN: 7 Nov 2002

AB The alkaloid content (lolitrem B and ergovaline) in Neotyphodium-infected
seeds of 21 perennial ryegrass (Lolium perenne L.) wild populations from the
North of Spain was analysed. The infection level in perennial ryegrass was
low to moderate (average = 40.1%), ranging from 8 to 80%. In most of the
populations (62%) the infection level was below 50%. In perennial ryegrass
seeds, the average lolitrem B content was 1.1 ppm, ranging from 0.0 to 7.1 ppm
and the average ergovaline content was 13.5 ppm, ranging from 1.0 to 36.2 ppm.
The relationships between endophyte infection and alkaloid content were
studied using Spearman's correlations. Significant correlations were found
between endophyte infection and ergovaline ($r = 0.59$ at $p < 0.01$). The
highest concentrations of lolitrem B and ergovaline were considered high
enough to induce "ryegrass staggers" and "fescue toxicosis" but the species
diversity in natural pastures of northern Spain can probably prevent the
disorders. In pastures abundant in natural endophyte-infected perennial
ryegrass, grazing seed heads should be avoided, because the highest levels of
alkaloids are actually found in seeds.

CC Toxicology - General and methods 22501
Animal production - General and methods 26502
Agronomy - Miscellaneous and mixed crops 52502
Agronomy - Forage crops and fodder 52506
Pest control: general, pesticides and herbicides 54600

IT Major Concepts
Agronomy (Agriculture); Animal Husbandry (Agriculture);
Infection; Pest Assessment Control and Management; Toxicology

IT Diseases
fescue toxicosis: toxicity

IT Diseases
ryegrass staggers: toxicity

IT Chemicals & Biochemicals
alkaloid: content; ergovaline; lolitrem
B: toxin

IT Miscellaneous Descriptors
natural pasture characteristics; species diversity

GT Spain (Europe, Palearctic region)

ORGN Classifier
Ascomycetes 15100
Super Taxa
Fungi; Plantae

decreased mowing frequency enhances alkaloid production/accumulation in tall fescue and perennial ryegrass.

CC Ecology: environmental biology - General and methods 07502
Ecology: environmental biology - Plant 07506
Ecology: environmental biology - Animal 07508
Biochemistry studies - General 10060
Plant physiology - Chemical constituents 51522
Invertebrata: comparative, experimental morphology, physiology and pathology - Insecta: physiology 64076
IT Major Concepts
Biochemistry and Molecular Biophysics; Terrestrial Ecology
(Ecology, Environmental Sciences)
IT Chemicals & Biochemicals
alkaloids: accumulation, feeding deterrent, production,
secondary metabolite; ergocristine; lolitrem
B; peramine
IT Methods & Equipment
reverse-phase LC-MS [reverse-phase light chromatography-mass
spectrometry]: analytical method
IT Miscellaneous Descriptors
mowing frequency
ORGN Classifier
Ascomycetes 15100
Super Taxa
Fungi; Plantae
Organism Name
Neotyphodium spp.: endophyte
Taxa Notes
Fungi, Microorganisms, Nonvascular Plants, Plants
ORGN Classifier
Gramineae 25305
Super Taxa
Monocotyledones; Angiospermae; Spermatophyta; Plantae
Organism Name
Festuca arundinacea [tall fescue]
Lolium perenne [perennial ryegrass]
Taxa Notes
Angiosperms, Monocots, Plants, Spermatophytes, Vascular Plants
ORGN Classifier
Insecta 75300
Super Taxa
Arthropoda; Invertebrata; Animalia
Organism Name
insect: herbivore, pest
Taxa Notes
Animals, Arthropods, Insects, Invertebrates
RN 511-08-0 (ergocristine)
81771-19-9 (lolitrem B)
102482-94-0 (peramine)
L48 ANSWER 5 OF 10 BIOSIS COPYRIGHT (c) 2006 The Thomson Corporation
on STN
AN 2001:299074 BIOSIS Full-text
DN PREV200100299074
TI Correlation of endophyte toxins (ergovaline and
lolitrem B) with clinical disease:
Fescue foot and perennial ryegrass staggers.
AU Tor-Agbidye, John [Reprint author]; Blythe, Linda L.; Craig, A.
Morrie
CS National Center for Toxicological Research, Jefferson, AR, 72079,

USA

SO Veterinary and Human Toxicology, (June, 2001) Vol. 43,
No. 3, pp. 140-146. print.
CODEN: VHTODE. ISSN: 0145-6296.

DT Article

LA English

ED Entered STN: 20 Jun 2001
Last Updated on STN: 19 Feb 2002

AB Fescue foot, summer syndrome, reproductive problems, and ryegrass staggers are all diseases of livestock related to endophyte toxins in pasture grasses. Range finding experiments and case studies of fescue foot relative to ergovaline toxin found in endophyte infected tall fescue and lolitrem B present in endophyte infected perennial ryegrass were conducted. Within 42 d of initiating a feeding trial with chopped tall fescue straw containing 825 ppb ergovaline and at environmental temperatures of 15.9 C clinical signs of fescue foot were seen in cattle. Sheep on tall fescue pastures in November consuming feed with 540 ppb ergovaline and at environmental temperatures of 7.8 C developed fescue foot in 21 d while sheep on the adjacent field in the previous 2 mo with environmental temperatures of 16.6 C and 12.8 C and 458 ppb ergovaline in the pasture grasses did not. In a field outbreak of fescue foot affecting 42/425 feeder lambs in November, the ergovaline of sample pasture grasses had a mean concentration of 813 ppb. Perennial ryegrass staggers was seen in 42/237 feeder lambs when mean lolitrem B in the sampled grass was 2135 ppb. Overgrazing both tall fescue and ryegrass fields increased probability of clinical disease since the highest levels of toxin were found in the crowns and basal leaf sheaths of tall fescue and perennial ryegrass respectively. Based on these findings, ergovaline dietary levels of 400 to 750 ppb to cattle and 500 to 800 ppb to sheep and lolitrem B levels of 1800 to 2000 ppb in feed for both species are approximated threshold values for disease. Cold environmental temperatures are equally important to toxin concentrations in precipitating fescue foot disease.

CC Animal production - Feeds and feeding 26504
Nutrition - General studies, nutritional status and methods 13202
Toxicology - General and methods 22501
Animal production - General and methods 26502
Medical and clinical microbiology - Mycology 36008
Plant physiology - Nutrition 51504
Phytopathology - Diseases caused by fungi 54502

IT Major Concepts
Animal Husbandry (Agriculture); Nutrition; Toxicology

IT Diseases
Neotyphodium infection: fungal disease

IT Diseases
fescue foot: toxicity

IT Diseases
perennial ryegrass staggers: toxicity

IT Chemicals & Biochemicals
ergovaline: dietary, toxin; lolitrem B: dietary, toxin

IT Miscellaneous Descriptors
environmental temperature; pasture; tall fescue straw: animal feed

ORGN Classifier
Bovidae 85715
Super Taxa
Artiodactyla; Mammalia; Vertebrata; Chordata; Animalia
Organism Name
cattle
sheep

Taxa Notes

Animals, Artiodactyls, Chordates, Mammals, Nonhuman
Vertebrates, Nonhuman Mammals, Vertebrates

ORGN Classifier

Fungi 15000

Super Taxa

Plantae

Organism Name

Neotyphodium coenophialum: endophyte

Neotyphodium lolii: endophyte

Taxa Notes

Fungi, Microorganisms, Nonvascular Plants, Plants

ORGN Classifier

Gramineae 25305

Super Taxa

Monocotyledones; Angiospermae; Spermatophyta; Plantae

Organism Name

perennial ryegrass: forage, host

tall fescue: forage, host

Taxa Notes

Angiosperms, Monocots, Plants, Spermatophytes, Vascular Plants

RN 2873-38-3 (ergovaline)

81771-19-9 (lolitrem B)

L48 ANSWER 6 OF 10 BIOSIS COPYRIGHT (c) 2006 The Thomson Corporation
on STN

AN 2000:123845 BIOSIS Full-text

DN PREV200000123845

TI Alkaloid production and chinch bug resistance in
endophyte-inoculated Chewings and strong creeping red fescues.

AU Yue, Q.; Johnson-Cicalese, J.; Gianfagna, T. J. [Reprint author];
Meyer, W. A.

CS Plant Science Department, Rutgers, State University of New Jersey,
New Brunswick, NJ, 08901-8520, USA

SO Journal of Chemical Ecology, (Jan., 2000) Vol. 26, No.
1, pp. 279-292. print.

CODEN: JCECD8. ISSN: 0098-0331.

DT Article

LA English

ED Entered STN: 5 Apr 2000

Last Updated on STN: 3 Jan 2002

AB Four Chewings fescue and two strong creeping red fescue selections that had
been artificially inoculated and stably maintained with four different
endophytes were evaluated in feeding trials with chinch bugs (Blissus
leucopterus hirtus). Significant differences in survival were found between
the endophyte-inoculated plants and their endophyte-free counterparts. After
seven days, 54.2% of chinch bugs were alive on endophyte-free tillers versus
only 7.4% of chinch bugs fed tillers from endophyte-inoculated plants. Some
differences were also found among the various plant-endophyte combinations.
In Petri dish preference trials, chinch bugs showed a preference for the CA
endophyte (obtained from a Chewings fescue) over the RC endophyte (obtained
from a strong creeping red fescue) in Chewings fescue selection C1117. Only
the inoculated plants produced ergovaline, peramine, and lolitrem B; moreover,
significant differences were found among the plant-endophyte combinations in
the levels of these alkaloids. The Chewings selections C1117 and C1090
produced more ergovaline, and C1090 more lolitrem B, than other plants,
regardless of endophyte source. In the presence of the RC endophyte, more
ergovaline and lolitrem B was produced than in the presence of the CA
endophyte regardless of plant genotype. Both host plant and endophyte,
therefore, contributed factors that determined alkaloid production. No

significant correlations between chinch bug survival and alkaloid levels were found, however, and overall, no one plant genotype or endophyte source proved to be significantly more toxic than another to chinch bugs. Nevertheless, the results clearly demonstrated that artificial inoculations of endophyte-free fescue genotypes can produce plants with increased toxicity to chinch bugs.

CC Economic entomology - General 60002
Ecology: environmental biology - General and methods 07502
Agronomy - Miscellaneous and mixed crops 52502
Invertebrata: comparative, experimental morphology, physiology and pathology - Insecta: general 64072
Pest control: general, pesticides and herbicides 54600
IT Major Concepts
Agronomy (Agriculture); Economic Entomology; Pest Assessment
Control and Management
IT Chemicals & Biochemicals
alkaloid: production; ergovaline; lolitrem
B
IT Miscellaneous Descriptors
pest resistance; plant breeding; survival
ORGN Classifier
Ascomycetes 15100
Super Taxa
Fungi; Plantae
Organism Name
Epichloe festucae
Taxa Notes
Fungi, Microorganisms, Nonvascular Plants, Plants
ORGN Classifier
Gramineae 25305
Super Taxa
Monocotyledones; Angiospermae; Spermatophyta; Plantae
Organism Name
Festuca rubra ssp. littoralis [strong creeping
fescue]: crop
Festuca rubra ssp. rubra [Chewings fescue]:
crop
Taxa Notes
Angiosperms, Monocots, Plants, Spermatophytes, Vascular Plants
ORGN Classifier
Heteroptera 75322
Super Taxa
Insecta; Arthropoda; Invertebrata; Animalia
Organism Name
Blissus leucopterus hirtus [chinch bug]: pest
Taxa Notes
Animals, Arthropods, Insects, Invertebrates
ORGN Classifier
Plantae 11000
Super Taxa
Plantae
Organism Name
plant: endophyte-inoculated
Taxa Notes
Plants
RN 2873-38-3 (ergovaline)
81771-19-9 (lolitrem B)

L48 ANSWER 7 OF 10 BIOSIS COPYRIGHT (c) 2006 The Thomson Corporation
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AN 1999:365555 BIOSIS Full-text

DN PREV199900365555
 TI Management, environmental and livestock interactions impact on
 perennial ryegrass/Neotyphodium/livestock associations.
 AU Wheatley, W. M. [Reprint author]
 CS Orange Agricultural College, The University of Sydney, Orange, New
 South Wales, 2800, Australia
 SO Garland, T. [Editor]; Barr, A. C. [Editor]. (1998) pp.
 45-48. Toxic plants and other natural toxicants. print.
 Publisher: CAB International, Wallingford Oxon OX10 8DE, England,
 UK; CAB International, 198 Madison Avenue, New York, New York
 10016-4341, USA.
 Meeting Info.: 5th International Symposium on Poisonous Plants
 (ISOPP 5). San Angelo, Texas, USA. May 18-23, 1997.
 ISBN: 0-85199-263-3.
 DT Book
 Conference; (Meeting)
 Book; (Book Chapter)
 Conference; (Meeting Paper)
 LA English
 ED Entered STN: 2 Sep 1999
 Last Updated on STN: 2 Sep 1999
 CC Toxicology - Veterinary 22508
 Animal production - Feeds and feeding 26504
 General biology - Symposia, transactions and proceedings 00520
 IT Major Concepts
 Animal Husbandry (Agriculture); Toxicology
 IT Diseases
 ryegrass staggers: toxicity
 IT Chemicals & Biochemicals
 ergovaline: alkaloid, toxicity; lolitrem
 B: alkaloid, toxicity
 IT Miscellaneous Descriptors
 Book Chapter; Meeting Paper
 GT New South Wales (Australia, Australasian region)
 ORGN Classifier
 Ascomycetes 15100
 Super Taxa
 Fungi; Plantae
 Organism Name
 Neotyphodium: endophyte, toxicity
 Taxa Notes
 Fungi, Microorganisms, Nonvascular Plants, Plants
 ORGN Classifier
 Bovidae 85715
 Super Taxa
 Artiodactyla; Mammalia; Vertebrata; Chordata; Animalia
 Organism Name
 sheep
 Taxa Notes
 Animals, Artiodactyls, Chordates, Mammals, Nonhuman
 Vertebrates, Nonhuman Mammals, Vertebrates
 ORGN Classifier
 Gramineae 25305
 Super Taxa
 Monocotyledones; Angiospermae; Spermatophyta; Plantae
 Organism Name
 Lolium perenne [perennial ryegrass]
 Taxa Notes
 Angiosperms, Monocots, Plants, Spermatophytes, Vascular Plants
 RN 2873-38-3 (ergovaline)

81771-19-9 (lolitrem B)

L48 ANSWER 8 OF 10 BIOSIS COPYRIGHT (c) 2006 The Thomson Corporation
on STN

AN 1995:278110 BIOSIS Full-text

DN PREV199598292410

TI Correlation of quantities of ergovaline and
lolitrem B toxins to clinical cases of tall
fescue toxicosis and perennial ryegrass staggers.

AU Tor-Agbidye, J.; Blythe, L. L.; Craig, A. M.

CS Coll. Vet. Med., Oreg. State Univ., Corvallis, OR, USA

SO Colegate, S. M. [Editor]; Dorling, P. R. [Editor]. (1994
) pp. 369-374. Plant-associated toxins: Agricultural,
phytochemical and ecological aspects.
Publisher: CAB International, 845 North Park Avenue, Tucson,
Arizona 85719, USA.
Meeting Info.: 4th International Symposium on Poisonous Plants
(ISOPP4). Fremantle, Western Australia, Australia. September
26-October 1, 1993.
ISBN: 0-85198-909-8.

DT Book
Conference; (Meeting)
Book; (Book Chapter)
Conference; (Meeting Paper)

LA English

ED Entered STN: 5 Jul 1995
Last Updated on STN: 5 Jul 1995

CC General biology - Symposia, transactions and proceedings 00520
Biochemistry studies - General 10060
Nutrition - Pathogenic diets 13216
Nervous system - Pathology 20506
Toxicology - General and methods 22501
Toxicology - Foods, food residues, additives and preservatives
22502
Veterinary science - Pathology 38004
Plant physiology - Chemical constituents 51522
Phytopathology - Diseases caused by fungi 54502

IT Major Concepts
Infection; Nervous System (Neural Coordination); Nutrition;
Toxicology; Veterinary Medicine (Medical Sciences)

IT Chemicals & Biochemicals
ERGOVALINE; LOLITREM B

IT Miscellaneous Descriptors
BOOK CHAPTER; MEETING PAPER; NEUROLOGIC DYSFUNCTION

ORGN Classifier
Bovidae 85715
Super Taxa
Artiodactyla; Mammalia; Vertebrata; Chordata; Animalia
Organism Name
sheep
Taxa Notes
Animals, Artiodactyls, Chordates, Mammals, Nonhuman
Vertebrates, Nonhuman Mammals, Vertebrates

ORGN Classifier
Fungi Imperfecti or Deuteromycetes 15500
Super Taxa
Fungi; Plantae
Organism Name
Acremonium coenophialum
Acremonium lolii

Taxa Notes

Fungi, Microorganisms, Nonvascular Plants, Plants

ORGN Classifier

Gramineae 25305

Super Taxa

Monocotyledones; Angiospermae; Spermatophyta; Plantae

Organism Name

Gramineae

Taxa Notes

Angiosperms, Monocots, Plants, Spermatophytes, Vascular Plants

RN 2873-38-3 (ERGOVALINE)

81771-19-9 (LOLITREM B)

L48 ANSWER 9 OF 10 BIOSIS COPYRIGHT (c) 2006 The Thomson Corporation
on STNAN 1995:182533 BIOSIS Full-text

DN PREV199598196833

TI Analysis of endophyte toxins: *Fescue* and other grasses
toxic to livestock.

AU Porter, J. K.

CS Toxicol. Mycotoxin Research Unit, Richard B. Russell Agric.
Research Center, ARS, USDA, Athens, GA 30613, USASO Journal of Animal Science, (1995) Vol. 73, No. 3, pp.
871-880.

CODEN: JANSAG. ISSN: 0021-8812.

DT Article

LA English

ED Entered STN: 26 Apr 1995

Last Updated on STN: 26 Apr 1995

AB Research on livestock toxicoses caused by *Acremonium* (endophyte)-infected grasses strongly implicate the ergopeptine alkaloids with *A. coenophialum*-infected *fescue* and paxilline and the lolitrem alkaloids with *A. lolii*-infected perennial ryegrass as the causative agents. Isolation, identification, and detection of these toxins involves extraction with appropriate solvents, clean-up procedures, and chromatographic methods with known standards. Thin-layer, high-performance liquid and gas chromatography along with ultraviolet and mass spectrometric (i.e., electron impact, chemical ionization, tandem mass) characterizations have been reported. These methods have varying degrees of success depending on the matrix from which the alkaloids have been extracted. Ergovaline is the primary ergopeptine alkaloid isolated from cultures of *A. coenophialum* and also from infected *fescue* grass and seeds toxic to livestock. Other compounds isolated from the endophyte-infected *fescue* include: lysergic acid amide (ergine), the clavine class of ergot alkaloids (chanoclavine I, agroclavine, elymoclavine, penniclavine), the pyrrolizidine alkaloids (N-formylloline, N-acetylloline, N-methyloline, N-acetylnorloline), and the unique pyrrolopyrazine alkaloid peramine. The loline alkaloids and peramine have been more associated with the insect-deterrent properties of the endophyte-infected *fescue* than with livestock toxicoses. Also, both peramine and the ergopeptine alkaloids (ergovaline, ergotamine) have been isolated from *A. lolii*-infected perennial ryegrass. More recently, paxilline and lolitrem B have been detected in laboratory cultures of *A. coenophialum* isolated from tall *fescue*. The ergot alkaloids in endophyte-infected perennial ryegrass may be more related to decreased animal productivity (weight gains, reproduction problems), whereas the lolitrems cause the staggers syndrome. The detection, isolation, identification, and analyses of these compounds from *Acremonium*-infected grasses is presented.

CC Toxicology - Veterinary 22508

Animal production - Feeds and feeding 26504

Medical and clinical microbiology - Mycology 36008

Veterinary science - Pathology 38004

Veterinary science - Microbiology 38006

Agronomy - Grain crops 52504

IT Major Concepts

Agronomy (Agriculture); Animal Husbandry (Agriculture);
Infection; Toxicology; Veterinary Medicine (Medical Sciences)

IT Miscellaneous Descriptors

livestock industry; FEEDING

ORGN Classifier

Bovidae 85715

Super Taxa

Artiodactyla; Mammalia; Vertebrata; Chordata; Animalia

Organism Name

Bovidae

Taxa Notes

Animals, Artiodactyls, Chordates, Mammals, Nonhuman
Vertebrates, Nonhuman Mammals, Vertebrates

ORGN Classifier

Fungi 15000

Super Taxa

Plantae

Organism Name

fungus

Taxa Notes

Fungi, Microorganisms, Nonvascular Plants, Plants

ORGN Classifier

Fungi Imperfecti or Deuteromycetes 15500

Super Taxa

Fungi; Plantae

Organism Name

Acremonium

Taxa Notes

Fungi, Microorganisms, Nonvascular Plants, Plants

ORGN Classifier

Mammalia 85700

Super Taxa

Vertebrata; Chordata; Animalia

Organism Name

mammal

Taxa Notes

Animals, Chordates, Mammals, Nonhuman Vertebrates, Nonhuman
Mammals, Vertebrates

L48 ANSWER 10 OF 10 BIOSIS COPYRIGHT (c) 2006 The Thomson
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AN 1991:134888 BIOSIS Full-text

DN PREV199191071428; BA91:71428

TI FUNGAL ENDOPHYTE-INFECTED GRASSES ALKALOID ACCUMULATION AND APHID
RESPONSE.

AU SIEGEL M R [Reprint author]; LATCH G C M; BUSH L P; FANNIN F F;
ROWAN D D; TAPPER B A; BACON C W; JOHNSON M C

CS PLANT PATHOL DEP, UNIV KENTUCKY, LEXINGTON, KENTUCKY 40546, USA

SO Journal of Chemical Ecology, (1990) Vol. 16, No. 12, pp.
3301-3316.

CODEN: JCECD8. ISSN: 0098-0331.

DT Article

FS BA

LA ENGLISH

ED Entered STN: 14 Mar 1991

Last Updated on STN: 14 Mar 1991

AB The occurrence of the alkaloids N-formyl and N-acetyl loline, peramine, lolitrem B, and ergovaline and the response of aphids to plants containing these compounds were determined in species and cultivars of *Festuca*, *Lolium*, and other grass genera infected with fungal endophytes (*Acremonium* spp., and *Epichloe typhina*). Twenty-nine of 34 host-fungus associations produced one or more of the alkaloids, most frequently peramine or ergovaline. Three alkaloids (lolines, peramine, and ergovaline) were found in tall fescue and in perennial ryegrass infected with *A. coenophialum*, while peramine, lolitrem B, and ergovaline were present in perennial ryegrass and in tall fescue infected with *A. lolii* and in *F. longifolia* infected with *E. typhina*. While *A. coenophialum* and *A. lolii* produced similar patterns of alkaloids regardless of the species or cultivar of grass they infected, isolates of *E. typhina* produced either no alkaloids or only one or two different alkaloids in the grasses tested. Aphid bioassays indicated that *Rhopalosiphum padi* and *Schizaphis graminum* did not survive on grasses containing loline alkaloids and that *S. graminum* did not survive on peramine-containing grasses. Ergovaline - containing grasses did not affect either aphid.

CC Behavioral biology - Animal behavior 07003
 Biochemistry studies - General 10060
 Plant physiology - Translocation, accumulation 51520
 Plant physiology - Chemical constituents 51522
 Agronomy - Forage crops and fodder 52506
 Economic entomology - Field, flower and truck crops 60004
 Economic entomology - Biological control 60014
 Invertebrata: comparative, experimental morphology, physiology and pathology - Insecta: pathology 64078

IT Major Concepts
 Agronomy (Agriculture); Behavior; Biochemistry and Molecular Biophysics; Economic Entomology; Pathology; Physiology

IT Miscellaneous Descriptors
 FESTUCA-LONGIFOLIA LOLIUM ACREMONIUM-COENOPHIALUM
 ACREMONIUM-LOLII RHOPALOSIPHUM-PADI SCHIZAPHIS-GRAMINUM PESTS
 BIOLOGICAL CONTROL

ORGN Classifier
 Fungi Imperfecti or Deuteromycetes 15500
 Super Taxa
 Fungi; Plantae
 Taxa Notes
 Fungi, Microorganisms, Nonvascular Plants, Plants

ORGN Classifier
 Gramineae 25305
 Super Taxa
 Monocotyledones; Angiospermae; Spermatophyta; Plantae
 Taxa Notes
 Angiosperms, Monocots, Plants, Spermatophytes, Vascular Plants

ORGN Classifier
 Homoptera 75324
 Super Taxa
 Insecta; Arthropoda; Invertebrata; Animalia
 Taxa Notes
 Animals, Arthropods, Insects, Invertebrates

=> d his

FILE 'HCAPLUS' ENTERED AT 13:22:02 ON 03 NOV 2006
 L1 1 S US20040143875/PN

FILE 'WPIX' ENTERED AT 13:22:52 ON 03 NOV 2006

L2 1 S L1

FILE 'HCAPLUS' ENTERED AT 13:32:10 ON 03 NOV 2006

E ENDOPHYTE/CT

E ENDOPHYT/CT

L3 2043 ENDOPHYT?/BI,CT,CW

FILE 'REGISTRY' ENTERED AT 13:33:27 ON 03 NOV 2006

E ERGOVALINE/CN

L4 5 E3-10

L5 1 E3

L6 10 C29H35N5O5 AND NC4-NC5-C6-C6/ES

L7 10 NCOC2-NC4-NC2NC2/ES AND L6

E LOLITREM/CN

L8 1 E7

L9 9 C42H55NO7

L10 4 L9 AND 7H?

FILE 'HCAPLUS' ENTERED AT 13:40:45 ON 03 NOV 2006

L11 126 L7

L12 141 ACIERGOVALININE OR ERGORINE OR ERGOBUTIN# OR INDOLO (4A

L13 146 L11-12

L14 62 L10

L15 72 LOLITREM (1A) (F OR B)

L16 72 L14-15

L17 25 L13 AND L16

E FESCUE/CT

E E3+ALL

E E2+ALL

L18 2544 E8+OLD,NT

L19 4324 FESCUE OR FESTUCA

L20 3 L17 AND L18

E ACREMONIUM/CT

E E23+ALL

L21 103 E1

E E2+ALL

E E7+OLD

E ACREMONIUM/CT

E E23+ALL

E E2+ALL

L22 179 E7+OLD

L23 1 L17 AND L22

L24 4 L20,L23

L25 1 (US2004-754149 OR US2002-066345)/AP,PRN OR (US6677507 O

L26 1 L1,L25

E BRUIJN J/AU

L27 46 E3-5

E DE BRUIJN J/AU

L28 104 E3-14

L29 1 E17

L30 2 BARENBRUG/CS,PA

L31 0 L17 AND L25-30

L32 0 L13,L16 AND L25-30

L33 1 L18-19,L21,L22 AND L25-30

L34 5 L24,L33,L1

L35 25 L3 AND L17

L36 0 L35 NOT L17

FILE 'BIOSIS' ENTERED AT 14:01:38 ON 03 NOV 2006

L37 36 L17

	E DE BRUIJN J/AU
L38	81 E3-11,E14
L39	4 (BARENBRUG OR BARENBURG)/CS
L40	0 L37 AND L38-39
L41	10 L19 AND L37
L42	34 L3 AND L37
	SEL AN 2-4 6-10
	DEL SEL Y
	SEL AN 2-4 6-10 L41
L43	8 E1-8 AND L41
	E FESTUCA/ORGN
L44	200 FESTUCA/ORGN
	E NEOTYPHODIUM/ORGN
L45	279 E3,E8-11
L46	5 L37 AND L44-45
L47	8 L43,L46 AND PY<=2002
L48	10 L43,L46,L47

[File 434] SciSearch(R) Cited Ref Sci 1974-1989/Dec
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```
? s ENDOPHYTE
S1      12886   S ENDOPHYTE

? s TALL FESCUE
S2      1690   S TALL FESCUE

? s EREGOVALINE
S3        0   S EREGOVALINE

? s ERGOVALINE
S4       792   S ERGOVALINE

? s LOLITREM
S5       505   S LOLITREM

? s S1 AND S4 AND S5
      12886   S1
      792     S4
      505     S5
S6       168   S S1 AND S4 AND S5

? s S6 AND S2
      168     S6
      1690    S2
S7        15   S S6 AND S2

? d S7/9/ALL
```

7/9/1 (Item 1 from file: 34) [Links](#)

Fulltext available through: [USPTO Full Text Retrieval Options](#) [SCIENCEDIRECT](#)

SciSearch(R) Cited Ref Sci

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15425129 **Genuine Article#:** 070QG **Number of References:** 63

Importance of host plant species, Neotyphodium endophyte isolate, and alkaloids on feeding by Spodoptera frugiperda (Lepidoptera : Noctuidae) larvae

Author: Ball OJP (REPRINT) ; Coudron TA; Tapper BA; Davies E; Trently D; Bush LP; Gwinn KD; Popay AJ
Corporate Source: Northland Polytech,Private Bag 9019/Whangarei//New Zealand/ (REPRINT); AgRes,Grassland Res Ctr,Palmerston North//New Zealand/; USDA ARS,Biol Control Insects Res Lab,Columbia//MO/65203; Univ Tennessee,Dept Entomol & Plant Pathol,Knoxville//TN/37901; Univ Kentucky,Dept Agron,Lexington//KY/40546; AgRes,Ruakura Res Ctr,Hamilton//New Zealand/

Journal: JOURNAL OF ECONOMIC ENTOMOLOGY , 2006 , V 99 , N4 (AUG) , P 1462-1473

ISSN: 0022-0493 **Publication date:** 20060800

Publisher: ENTOMOLOGICAL SOCIETY AMERICA , 10001 DEREKWOOD LANE, STE 100, LANHAM, MD 20706-4876 USA

Language: English **Document Type:** ARTICLE

Geographic Location: New Zealand; USA

Journal Subject Category: ENTOMOLOGY

Abstract: Three grass host species-tall fescue, *Festuca arundinacea* Schreber; meadow fescue, *Festuca pratensis* Hudson; and perennial ryegrass, *Lolium perenne* L.-each infected with a number of different *Neotyphodium endophyte* isolates, were investigated for their effects on fall armyworm, *Spodoptera frugiperda* (J.E. Smith). Alkaloid profiles varied among associations. Choice and no-choice tests comparing feeding and early development of *S. frugiperda* larvae on **endophyte**-infected and **endophyte**-free leaf blade material were performed.

Endophyte-mediated resistance to *S. frugiperda* was greatest in meadow fescue and weakest in tall fescue. Some **endophyte** isolates, particularly in perennial ryegrass and meadow fescue, had a major effect on feeding and development of *S. frugiperda*, whereas others had no effect or were only weakly efficacious. In tall fescue, some associations deterred *S. frugiperda* from feeding in choice tests but had no effect on development, whereas larvae reared on other associations weighed significantly more than control larvae fed **endophyte**-free grass. It was concluded that the deleterious consequences of **endophyte** infection were easily masked by other factors in tall fescue. Relative leaf age had no effect on feeding preferences in the three host species. Chemical analysis of herbage from the plants used, and results from a no-choice study using spiked artificial diets, failed to individually implicate any of the major known alkaloids (peramine, **lolitrem B**, **ergovaline**, and lolines) in the observed effects on *S. frugiperda*. Hypotheses explaining these observations, and their impact on creating desirable grass-**endophyte** associations for use in pastures, are discussed.

Descriptors--Author Keywords: insect resistance ; alkaloid ; armyworm ; fescue ; ryegrass

Identifiers-- KeyWord Plus(R): FALL ARMYWORM LEPIDOPTERA; INFECTED PERENNIAL RYEGRASS; ARGENTINE STEM WEEVIL; **TALL FESCUE**; FUNGAL **ENDOPHYTE**; LOLIUM-PERENNE; **LOLITREM-B**; ACREMONIUM-COENOPHIALUM; MEDIATED RESISTANCE; EPICHLLOE-TYPHINA

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Transformation of the ryegrass endophyte *Neotyphodium lolii* can alter its in planta mycelial morphology

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Abstract: The fungus *Neotyphodium lolii* grows in the intercellular spaces of perennial ryegrass as a mutualistic endosymbiont. One of the benefits it conveys to the plant is the production of alkaloids toxic to herbivores. We wanted to determine in planta expression patterns of the *N. lolii* 3-hydroxy-3-methylglutaryl-CoA reductase (HMG CoA reductase) gene, believed to be involved in the synthesis of two of these alkaloid toxins, **lolitrem B** and **ergovaline**. We transformed the *N. lolii* strain Lp19 with plasmids, in which DNA fragments upstream of the open reading frame of the *N. lolii* HMG CoA reductase gene controlled expression of the GUS (*gusA*; *Escherichia coli* P-glucuronidase) reporter gene. In exponentially growing cultures, the GUS gene was not expressed if the length of upstream sequence was less than 400bp, and > 1100bp were required for maximum expression. When reintroduced into ryegrass plants, transformants often showed highly increased hyphal branching compared to the wild-type parent strain, although in culture their growth kinetics and morphology were indistinguishable from that of the wild-type. Deterioration of hyphae and the hypha-plant interface occurred and in one transformant reduced tillering (formation of new plants, referred to in agronomy as tillers) and death of infected plants. We found no evidence that these abnormalities were caused by interference of the construct with the function of the native gene, as judged by analysis of the site of integration of the promoter-GUS cassette, expression of the native gene and **lolitrem B** and **ergovaline** levels in infected plants. However, there was some correlation between GUS expression and the degree of hyphal branching, suggesting that high levels of P-glucuronidase may disturb the symbiotic interaction. Levels of another alkaloid, peramine, were also not significantly affected by transformation. In previous studies increased in planta branching of the **endophyte** has been shown to be associated with a severe reduction of alkaloid production. Our results show that a plant-**endophyte** association in which increased branching occurs is still able to produce alkaloids. (c) 2006 The British Mycological Society. Published by Elsevier Ltd. All rights reserved.

Descriptors--Author Keywords: genetic engineering ; hyphal growth ; *Lolium perenne* ; plasmids

Identifiers-- KeyWord Plus(R): HMG-COA REDUCTASE; HYGROMYCIN-B RESISTANCE; ACREMONTIUM ENDOPHYTE; REGULATORY ELEMENT; ESCHERICHIA-COLI; TALL FESCUE; GRASSES; GENE; EXPRESSION; ALKALOIDS

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